

Follow the Flow: Linking Iron Oxide Signatures in the Puyallup Watershed to Sediment Sources

By Katrina Lester and Peter Selkin

Rivers provide resources but also pose erosion and flood risks. Recent floods along the Puyallup/White River Watershed have highlighted local flood and erosion hazards which depend on sediment transport and deposition. One challenge in predicting hazards is knowing where sediment originates and how it is transported. This project tracks the erosion and transport of sediment using iron oxides from suspended sediment as natural tracers of sediment sources. We use magnetic susceptibility and isothermal remnant magnetization (IRM), related to iron oxide concentration, and magnetic coercivity, related to oxide mineralogy, to distinguish between minerals in suspended sediment from the White, Carbon and Puyallup Rivers from summer and winter of 2024-2025. Magnetic susceptibility tends to be higher in summer than in winter, and higher in the Carbon/Puyallup than in the White; high variability in winter obscures the difference in several locations. Magnetic susceptibility is not correlated with distance downstream along the rivers. However, additional sites along each river would provide more clarity. IRM of summer sediment from the Puyallup and White Rivers is similar, whereas there is a difference for winter sediment. Magnetic coercivity is similar across seasons and rivers except the White River summer sediment. These results are consistent with higher amounts of iron oxide in summer sediment while concentration in winter sediment varies. The coercivity variations suggest that iron oxide mineralogy is different in the White River. These data can help narrow down the sediment sources in the Puyallup Watershed to pinpoint areas for potential flood and erosion hazards.